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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/715,986	11/18/2003	Tiezhi Zhang	1512.027	4893

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BOYLE FREDRICKSON NEWHOLM STEIN & GRATZ S.C.
250 E. Wisconsin Avenue
Suite 1030
MILWAUKEE, WI 53202

EXAMINER	
TOTH, KAREN E	
ART UNIT	**PAPER NUMBER**
3735	

NOTIFICATION DATE	DELIVERY MODE
07/05/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@boylefred.com

Office Action Summary	Application No.	Applicant(s)	
	10/715,986	ZHANG ET AL.	
	Examiner	Art Unit	
	Karen E. Toth	3735	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 April 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-14 and 16-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *2-11, 16-25* is/are allowed.

6)☒ Claim(s) *12,13,26 and 27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Allowable Subject Matter

2. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record fails to anticipate or make obvious the method and structure of claims 2-11, 14, and 16-25, including, *inter-alia*, using chest displacement signals to correct an integration offset of a lung volume signal to produce a corrected respiration signal based on a chest displacement signal.

Hoffman (US Patent Application Publication 2002/0120207) discloses a monitor comprising a spirometer that measures a patient's breathing to provide an air flow signal (paragraphs [0068], [0074], [0077]); a sensor measuring chest displacement caused by breathing to provide a chest displacement signal (paragraphs [0070]-[0071], [0078]); and a calibration circuit that receives and combines both signals to generate a corrected respiration signal (paragraphs [0066], [0069], [0080]). Hoffman does not disclose using the signals to correct an integration offset while generating the corrected respiration signal.

Claim Rejections - 35 USC § 103

3. Claims 12 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mostafavi'266 (US Patent 6959266) in view of Corn (US Patent 6062216) and Sackner (US Patent 6413225).

Regarding claim 12, Mostafavi'266 discloses a radiation therapy system comprising an optical sensor adapted to monitor chest displacement during breathing (column 3, lines 48-57); and a controllable radiation source that delivers radiation to a patient based upon the respiration signal (column 5, lines 34-44). Mostafavi'266 does not disclose using a laser to monitor chest displacement, capturing an air flow signal using a spirometer, calibrating the signals by combining the air flow signal with the displacement signal, and using the calibrated signal for radiation gating.

Corn teaches a system for monitoring a patient's breathing comprising a laser sensor for monitoring chest movement during breathing (column 1, lines 63-67; column 2, lines 41-48), in order to obtain an accurate and non-invasive chest displacement signal.

Sackner teaches a system for monitoring respiration comprising a spirometer for measuring air flow (element 22; column 4 line 66 to column 5 line 1); a sensor for monitoring chest displacement (elements 12, 14); and a calibration circuit that combines the air flow and chest displacement signals to obtain a corrected respiration signal (column 3, lines 38-48), in order to most accurately monitor the patient's respiration. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have made the system of Mostafavi'266 with a laser for measuring chest displacement, as taught by Corn, in order to obtain an accurate and non-invasive

displacement measurement, and a spirometer for measuring air flow and a circuit to combine the air flow and chest displacement signals to obtain a corrected respiration signal, as taught by Sackner, in order to more accurately monitor respiration during radiation gating.

Regarding claim 26, Mostafavi'266 discloses method of delivering radiation therapy comprising using an optical sensor adapted to monitor chest displacement during breathing (column 3, lines 48-57); and using a controllable radiation source to deliver radiation to a patient based upon the respiration signal (column 5, lines 34-44). Mostafavi'266 does not disclose using a laser to monitor displacement, capturing an air flow signal using a spirometer, calibrating the signals by combining the air flow signal with the displacement signal, and using the calibrated signal for radiation gating.

Corn teaches a method of monitoring a patient's breathing comprising using a laser sensor to monitor chest movement during breathing (column 1, lines 63-67; column 2, lines 41-48), in order to obtain an accurate and non-invasive chest displacement signal.

Sackner teaches a method for monitoring respiration comprising using a spirometer to measure air flow (element 22; column 4 line 66 to column 5 line 1); a sensor for monitoring chest displacement (elements 12, 14); and using a calibration circuit to combine the air flow and chest displacement signals to obtain a corrected respiration signal (column 3, lines 38-48), in order to most accurately monitor the patient's respiration. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have made the method of Mostafavi'266 and used a

laser to measure chest displacement, as taught by Corn, in order to obtain an accurate and non-invasive measurement, and a spirometer to measure air flow and a circuit to combine the air flow and chest displacement signals to obtain a corrected respiration signal, as taught by Sackner, in order to more accurately monitor respiration during radiation gating.

4. Claims 13 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mostafavi'804 (US Patent Application Publication 2004/0116804) in view of Corn and Sackner.

Regarding claim 13, Mostafavi'804 discloses a medical imaging system comprising an optical displacement sensor adapted to monitor chest displacement during breathing and provide a chest displacement signal (paragraphs [0044]-0045], [0047]); and an imager that acquires component image signals from the internal anatomy of a patient over different phases of respiration and mathematically combines them according to respiration phases to produce a composite image of the internal anatomy (paragraphs [0088], [0090]-[0097]). Mostafavi'804 does not disclose capturing an air flow signal using a spirometer, calibrating the signals by combining the air flow signal with the displacement signal, and using the calibrated signal for gating the image captures.

Corn teaches a system for monitoring a patient's breathing comprising a laser sensor for monitoring chest movement during breathing (column 1, lines 63-67; column

2, lines 41-48), in order to obtain an accurate and non-invasive chest displacement signal.

Sackner teaches a system for monitoring respiration comprising a spirometer for measuring air flow (element 22; column 4 line 66 to column 5 line 1); a sensor for monitoring chest displacement (elements 12, 14); and a calibration circuit that combines the air flow and chest displacement signals to obtain a corrected respiration signal (column 3, lines 38-48), in order to most accurately monitor the patient's respiration. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have made the system of Mostafavi'804 with a laser for measuring chest displacement, as taught by Corn, in order to obtain an accurate and non-invasive displacement measurement, and a spirometer for measuring air flow and a circuit to combine the air flow and chest displacement signals to obtain a corrected respiration signal, as taught by Sackner, in order to more accurately monitor respiration while capturing images.

Regarding claim 27, Mostafavi'804 discloses a method of capturing medical images comprising using a laser displacement sensor adapted to monitor chest displacement during breathing and provide a chest displacement, or respiration, signal (paragraphs [0044]-0045], [0047]); acquiring component image signals from the internal anatomy of a patient over different phases of respiration, as determined by the respiration signal, and mathematically combining them according to respiration phases to produce a composite image of the internal anatomy (paragraphs [0088], [0090]-[0097]). Mostafavi'804 does not disclose capturing an air flow signal using a spirometer,

calibrating the signals by combining the air flow signal with the laser signal, and using the calibrated signal for gating the image captures.

Corn teaches a method of monitoring a patient's breathing comprising using a laser sensor to monitor chest movement during breathing (column 1, lines 63-67; column 2, lines 41-48), in order to obtain an accurate and non-invasive chest displacement signal.

Sackner teaches a method of monitoring respiration comprising using a spirometer to measure air flow (element 22; column 4 line 66 to column 5 line 1); using a sensor to monitor chest displacement (elements 12, 14); and combining the air flow and chest displacement signals to obtain a corrected respiration signal (column 3, lines 38-48), in order to most accurately monitor the patient's respiration. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have made the method of Mostafavi'804 with a laser to measure chest displacement, as taught by Corn, in order to obtain an accurate and non-invasive measurement, and a spirometer to measure air flow and combining the air flow and chest displacement signals to obtain a corrected respiration signal, as taught by Sackner, in order to more accurately monitor respiration while capturing images.

Response to Arguments

5. Applicant's arguments filed 23 April 2007 have been fully considered but they are not persuasive.

Applicant has argued that Sackner's respiration monitoring system could not be used with Mostafavi's systems because Sackner monitors chest displacement via physical sensors. The rejections above do not call for using Sackner's sensors; rather, Sackner is used to disclose an example of obtaining and correcting a respiration signal by combining an air flow signal with a chest displacement signal. The manner in which the chest displacement signal is obtained is not pertinent, since Mostafavi has already provided means for doing so.

As such, there is motivation for combining either Mostafavi reference with Sackner, since it is desirable to use the most accurate respiration signal available when using such a signal to trigger radiation therapy; using Sackner's manner of respiration signal correction would provide a highly accurate signal to Mostafavi's systems, which would then be used in turn to trigger the radiation therapy.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karen E. Toth whose telephone number is 571-272-6824. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Marmor, II can be reached on 571-272-4730. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Vket

CHARLES A. MARMOR II
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3700